9302113

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

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Mr. David B. Jansen, P.E.
Hanford Project Manager
State of Washington
Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Dear Mr. Jansen:

LIQUID EFFLUENT RETENTION FACILITY LEACHATE COLLECTION SYSTEM TECHNICAL PRESENTATION MATERIALS

Attached please find a technical summary of the leachate detection, collection and removal system for the Liquid Effluent Retention Facility basins. This information was presented to Mr. Jaraysi of Ecology on November 23, 1992. Mr. Jaraysi expressed his appreciation for the information given in the meeting and stated that he believes the design meets requirements. A copy of this attachment is being provided to the State of Washington Department of Ecology at Mr. Jaraysi's request.

If you have any further questions please contact Mr. Dana Bryson of my staff on (509) 372-0738.

Sincerely,

R. P. Carter
for June M. Hennig, Director
Waste Management Division

WMD:DCB

Attachment

cc w/att:
P. Day, EPA
D. Duncan, EPA
B. Austin, WHC

LIQUID EFFLUENT RETENTION FACILITY
LEACHATE DETECTION, COLLECTION AND REMOVAL SYSTEM

The Liquid Effluent Retention Facility (LERF) is located in the 200 East Area, north of the 242-A Evaporator (Fig. 1). The LERF consists of three identical surface retention basins constructed with a catch basin, primary and secondary composite liners, a leachate detection, collection and removal system between the liners, and a floating tensioned cover. Each of the basins have an operating capacity of 6.5 millions gallons for storage.

Process condensate from 242-A Evaporator is transferred to LERF basins though a 3-inch diameter pipe encased in a 6-inch containment pipe. Both carrier and containment pipes are made of fiber-glass reinforced epoxy thermoset resin. The annular space between the 3-inch and 6-inch pipes is designed to collect and detect any leaks from the carrier pipe. The effluent enters LERF at catch basins provided at the northwest corner of each retention basin where the inlet pipes, leachate risers, transfer pipes, controls and flow meters are installed (Fig.2 & 3). The catch basin is coated with a special protective coating to seal the concrete against leaks.

The Leachate Detection, Collection and Removal System (LDCRS) was designed and constructed to comply with Minimum Technology Design Criteria requirements of USEPA and Washington Administrative Code for surface impoundments (Table 1). System components include a synthetic geonet layer, granular drainage layer, a sump, leachate pump, leachate risers and instrumentation for level monitors and flow controls (Fig.4 and 5). The system exceeds the performance requirements mandated by the regulations.

Leachate permeating through the primary liner travels through the geonet and gravel layer to the sump where it is removed by a deep well pump through a 1½ inch diameter pipe and discharged back into the basin. The total travel time for leachate is less than 24 hours. The capacity of the pump, 2 to 7 gpm, exceeds the Rapid Action Leak rate of 2.4 gpm. The rate of flow is measured with a flow meter/totalizer and a sampling port is provided for collecting leachate at the catch basin.

Instrumentation for the leachate system consists of level sensors, flow/totalizer, and pump controls. Indicators for level and pump status are provided locally and at the 242-A Evaporator control room (FIG. 5). The flow/volume of leachate removed from the sump is displayed locally. Local controls at the catch basin provide for manual or automatic operation of the leachate pump. Automatic controls for the leachate pump maintain an operating range of 2-inches and it is activated to start when the liquid level in the sump reaches 13-inches above the bottom of the sump and is shut off when the level reaches 11-inches. A continuous level probe in the leachate system provides an output signal that can be programmed within the Evaporator control system to initiate an alarm at select leachate levels determined by the operator.

TABLE 1

LIQUID EFFLUENT RETENTION FACILITY(LERF)
LEACHATE DETECTION, COLLECTION AND REMOVAL SYSTEM(LCRS)

COMPARISON: COMPLIANCE GUIDELINES vs DESIGN AND CONSTRUCTION DETAILS

SOURCE: 1) EPA/530-SW-85-014- Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments- Design, Construction and Operation, USEPA.
2) WASHINGTON ADMINISTRATIVE CODE(WAC) 173-303-650.

PROPERTY	*MINIMUM TECHNOLOGY GUIDANCE REQUIREMENTS EPA/530-SW-85-014	DESIGN AND CONSTRUCTION FEATURES TO MEET THE REQUIREMENTS
DRAINAGE LAYER(LCRS)	RAPID DETECTION, COLLECTION AND REMOVAL OF LEACHATE; NO OR LITTLE HEAD ON THE LINER	TIME OF TRAVEL FOR DETECTION -17 HOURS; LEACHATE PUMP RATE 2 TO 7 GPM, EXCEEDS RAPID LARGE LEAK RATE OF 2.43 GPM(FS=2.9); MAXIMUM HEAD ON BOTTOM LINER IS 1 INCH
SLOPE OF LCRS	2%	2%
HYDRAULIC CONDUCTIVITY A) GRAVEL OR OTHER NATURAL MATERIAL	GRAVEL WITH A MINIMUM PERMEABILITY OF 1X10E-2 CM/SEC OR EQUAL	CLEAN GRAVEL WITH A PERMEABILITY OF 2CM/SEC FACTOR OF SAFTEY(FS)=200
B) SYNTHETIC MATERIAL	SYNTHETIC DRAINAGE MATERIAL WITH A TRANSMISSIVITY OF 3X10E-5 SM/SEC	GEONET WITH A MINIMUM TRANSMISSIVITY OF 8X10E-4 SM/SEC AT A GRADIENT OF 1.5;FS=26
FLEXIBLE MEMBRANE LINERS	CHEMICALLY RESISTANT (PVC, CPVC OR HDPE); 30 Mil; IN CONTACT WITH SOIL LINER	HIGH COMPATIBLE HDPE; 60 MIL;IN CONTACT WITH SOIL/BENTONITE LINER
SUMP	INDIVIDUAL UNITS 12 INCHES BELOW DRAINAGE LAYER	SUMP FOR EACH BASIN 12 INCHES BELOW LCRS
COVERAGE	COLLECTION SYSTEM TO COVER AREAS EXPOSED TO WASTE AND LEACHATE	GRAVEL AT THE BOTTOM GEONET AT THE TOP
METHODS OF MEASURE OF FLUID VOLUMES	MEASURE AND RECORD FLOW VOLUMES IN THE SUMP	LEVEL SENSORS, FLOW RATE MONITORS, RECORDERS, CONTROLLERS, SET POINTS FOR ALARMS

* MINIMUM TECHNOLOGY GUIDANCE OF SECTIONS 3004(O) AND 3015 OF HAZARDOUS AND SOLID WASTE AMENDMENTS ACT(HSWA) OF 1984.

/LERFTAB

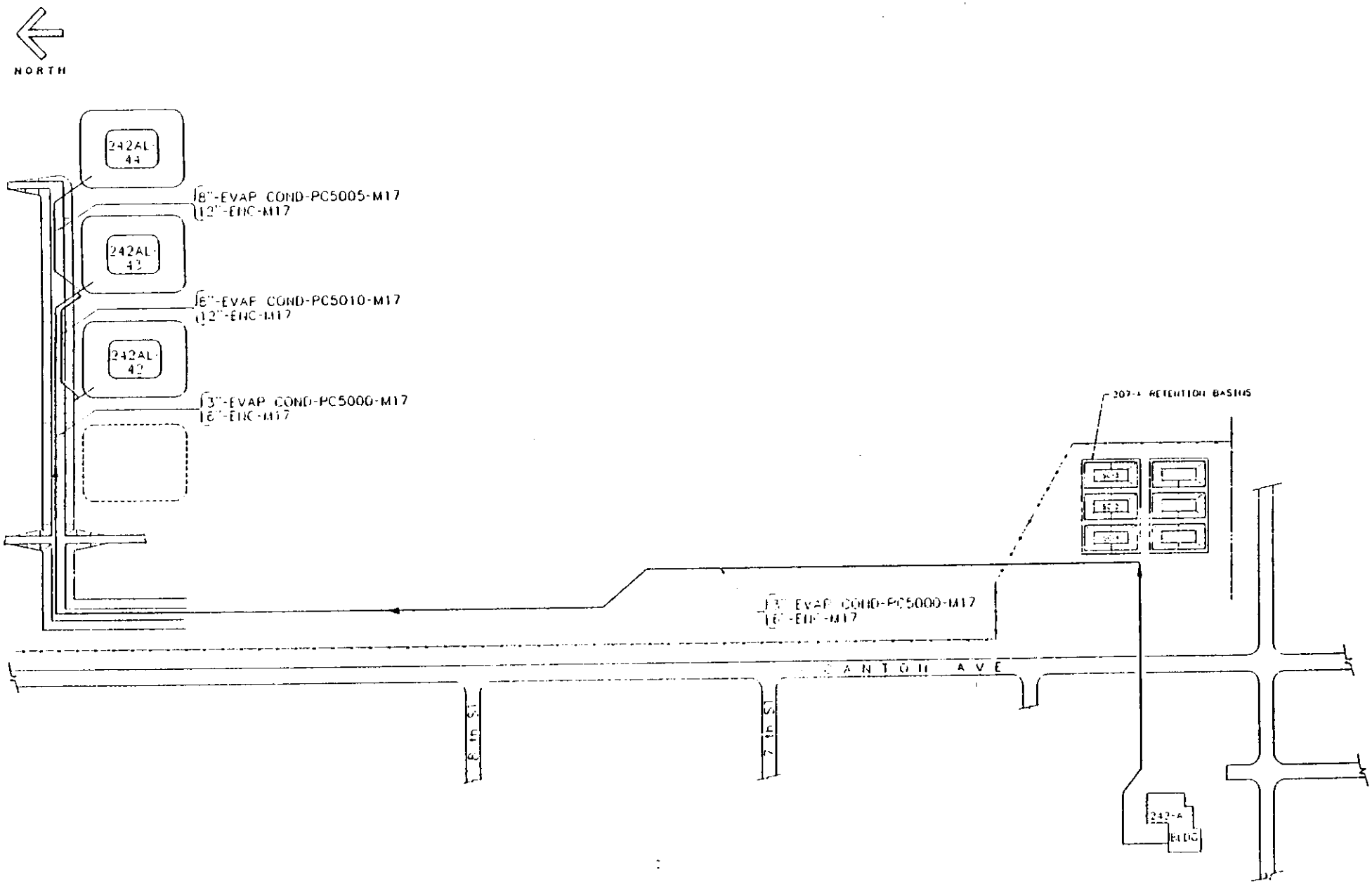
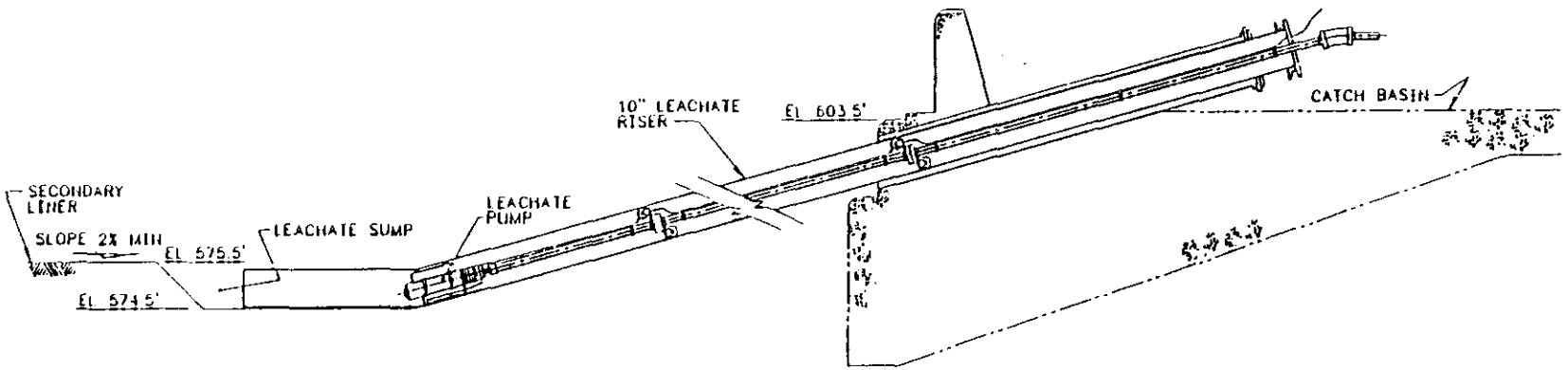
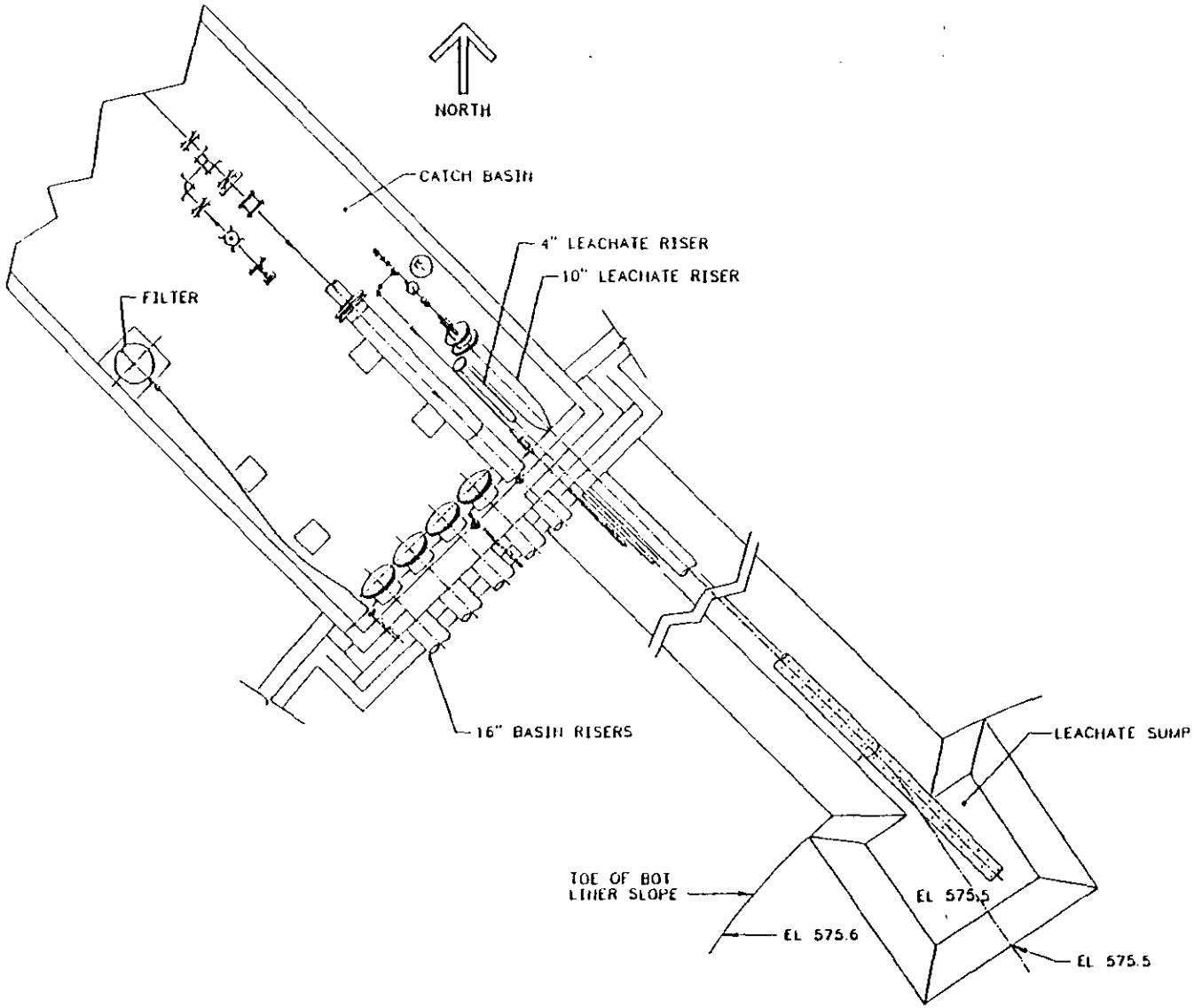

NORTH
242AL-44
8"-EVAP COND-PC5005-M17
12"-ENC-M17
242AL-43
8"-EVAP COND-PC5010-M17
12"-ENC-M17
242AL-42
3"-EVAP COND-PC5000-M17
6"-ENC-M17
207-A RETENTION BASINS
3"-EVAP COND-PC5000-M17
6"-ENC-M17
ANTON AVE
242-A BLDG

FIG 1



ELEVATION
LEACHATE DETECTION, COLLECTION AND REMOVAL SYSTEM

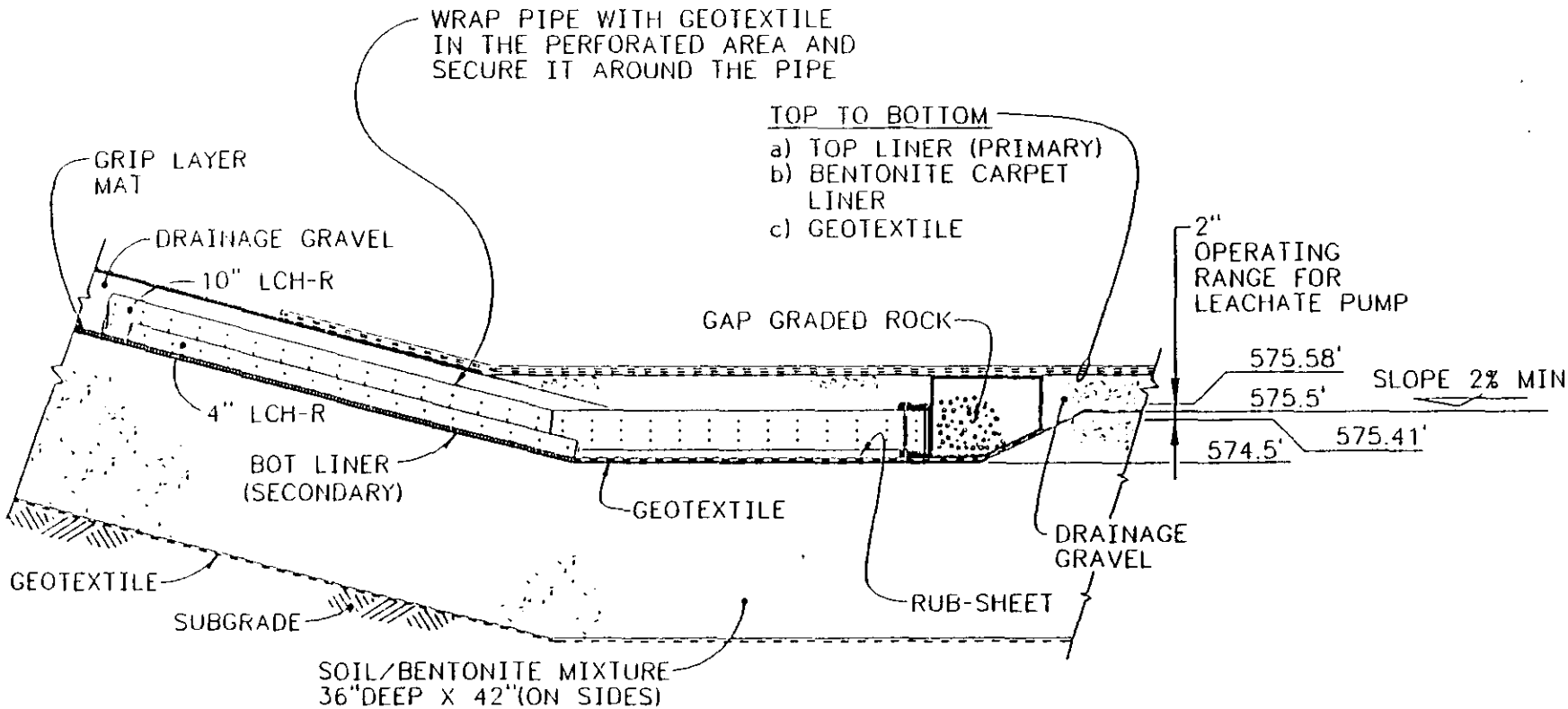
FIG 2



PLAN

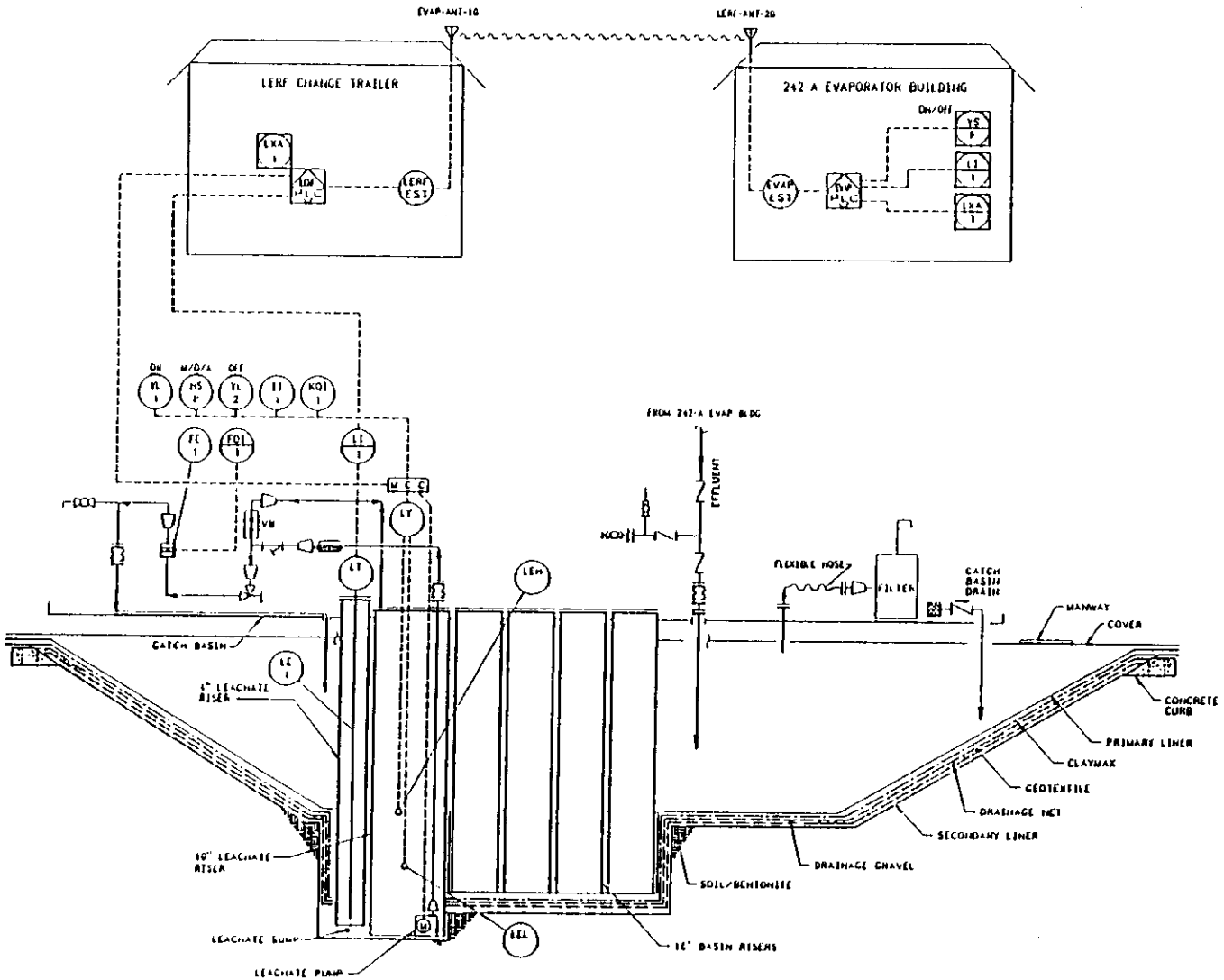
LEACHATE DETECTION, COLLECTION AND REMOVAL SYSTEM

FIG 3



SECTION
LEACHATE SUMP

FIG 4



SCHEMATIC OF
RETENTION BASIN
LEACHATE SYSTEM INSTRUMENTATION

ABBREVIATIONS LEGEND

EVAP EST	242-A RADIO MODEM
EVAP PLC	242-A LOGIC CONTROLLER
FE	FLOW ELEMENT
FQI	FLOW TOTALIZER INDICATOR
HS	LOCAL MANUAL SUMP PUMP CONTROL
II	LOCAL SUMP PUMP CURRENT INDICATOR
KQI	LOCAL SUMP PUMP CURRENT TOTALIZER INDICATOR
LE	CONTINUOUS LEVEL ELEMENT
LEH	LEVEL ELEMENT HIGH
LEL	LEVEL ELEMENT LOW
LI	LEVEL INDICATOR
LT	LEVEL TRANSMITTER
LY	LEVEL RELAY
LERF EST	LERF RADIO MODEM
LERF PLC	LERF LOGIC CONTROLLER
LXA	LEVEL SIGNAL ALARM
MCC	MOTOR CONTROL CENTER
VB	AIR RELEASE/VACUUM BREAKER
YS	SUMP PUMP STATUS INDICATOR
YL "ON"	LOCAL SUMP PUMP STATUS INDICATOR
YL "OFF"	LOCAL SUMP PUMP STATUS INDICATOR

SYMBOL LEGEND

RADIO MODEM ANTENNAS

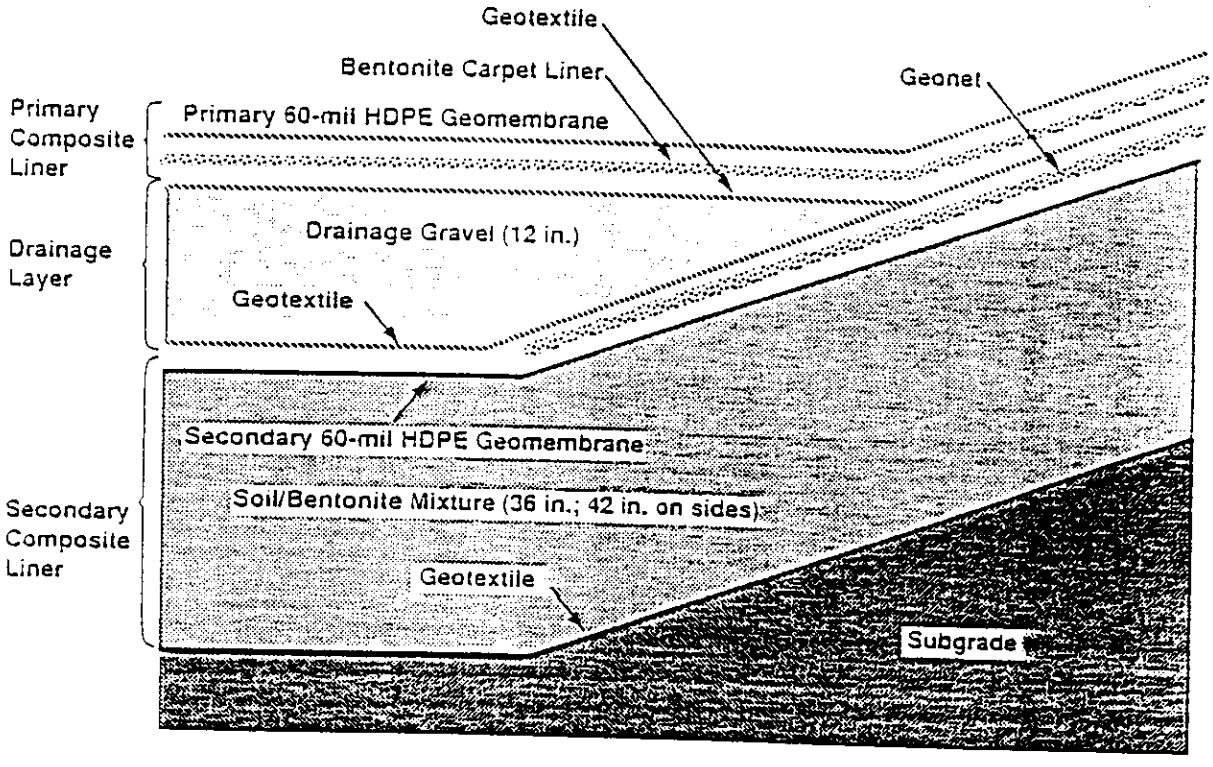
MCS SHARED DISPLAY AND/OR CONTROL (ACCESSIBLE TO OPERATOR)

LOCAL MOUNTED INSTRUMENT

FIELD MOUNTED PROGRAMMABLE LOGIC CONTROL

PANEL MOUNTED INSTRUMENT

FIG 5



Liner System Schematic.

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
J. M. Hennig, RL	D. B. Jansen, Ecology	Incoming: 9302113

Subject: LIQUID EFFLUENT RETENTION FACILITY LEACHATE COLLECTION SYSTEM TECHNICAL PRESENTATION MATERIALS

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